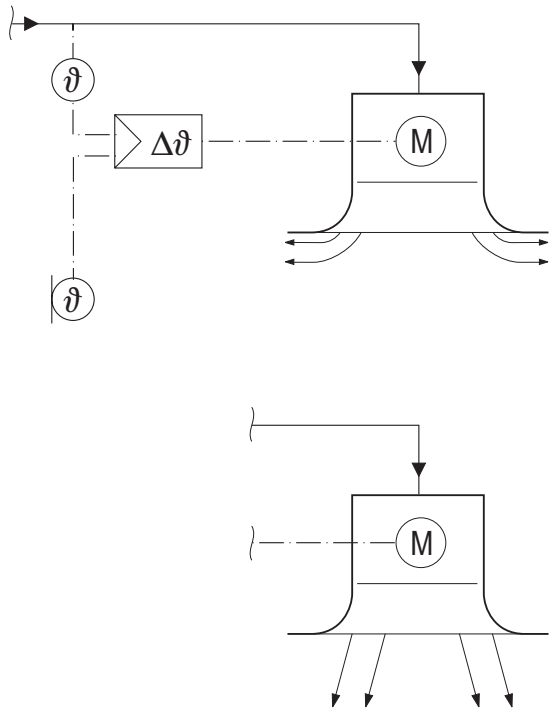
Technical Selection



Temperature difference control device ST-E for adjustable air outlets

DS 1282 E 03.2006

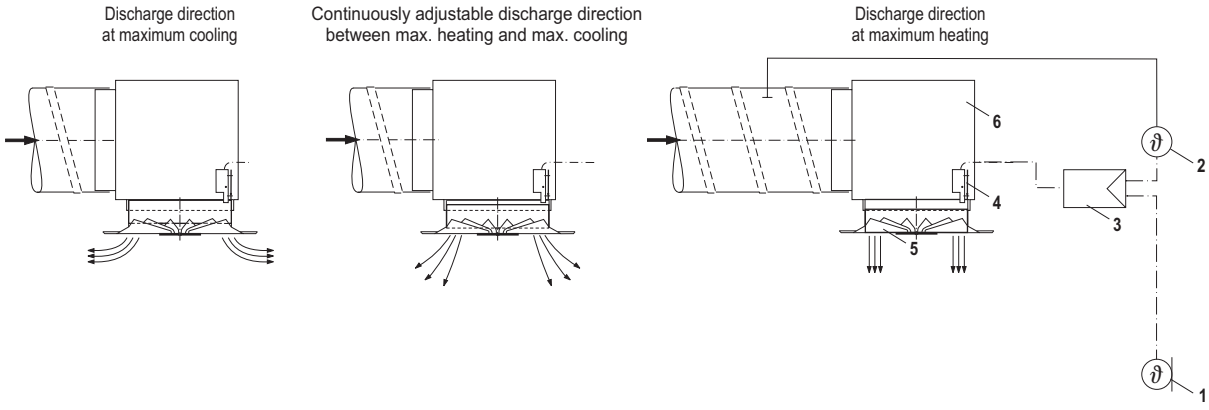
Air-conditioning components

KOMPONENTEN ®

Applied system solutions

Temperature difference control device

for adjustable air outlets



1 Temperature sensor for indoor air
2 Temperature sensor for supply air
3 Controller
4 Electric servomotor
5 Adjustable radial outlet
6 Connection box

Temperature difference control device, illustrated with an adjustable radial outlet

Preliminary remarks

Air outlets with adjustable discharge direction are used in rooms whose thermal loads vary strongly between cooling and heating. Depending on the room load, these outlets are able to discharge supply air in a direction varying from horizontal (cooling mode) to vertical (heating mode) so as to flush the room evenly. By adjusting the discharge direction in response to the prevailing cooling or heating load, i.e. as a function of the temperature difference between supply air and indoor air, ideal air flow conditions can be obtained in the room. The temperature difference control device from KRANTZ KOMPONENTEN works according to this principle.

Construction design and function

The temperature difference control device mainly consists of a temperature sensor for indoor air **1**[1)], a temperature sensor for supply air **2**, and a controller **3**. The temperatures measured by the two sensors are transmitted to the controller which calculates the temperature difference and gives an electrical output signal to the servomotor **4** of the air outlet. The controller and the servomotor are tuned to each other, i.e. a certain control variable is alloted to every temperature difference value. For this purpose, a control curve is to be worked out as a function of the air outlet type, the servomotor selected, the discharge height and the air outlet flow rate. This control curve is made by KRANTZ KOMPONENTEN on the basis of the specific project parameters. The temperature difference control device is configured at the works according to this data. An optional operator unit enables the mechanical contractor or system user to change the presettings later on site. The control curve for adjustable air outlets shows an example of the adjustment of the discharge direction for an adjustable radial outlet. It illustrates the correlation between the temperature difference supply air–indoor air, the electrical output signal of the controller, and the stroke of the servomotor.

Continuous adjustment of the discharge direction via the temperature difference control device enables optimum air jet penetration depths for any operating condition ranging between the maximum cooling and heating loads.

The temperature difference control device is geared to the 0 – 10 V modulating servomotors selected by KRANTZ KOMPONENTEN. Up to 40 air outlets can be controlled by a single device at a time.

1) A second temperature sensor for indoor air may be used for mean value determination

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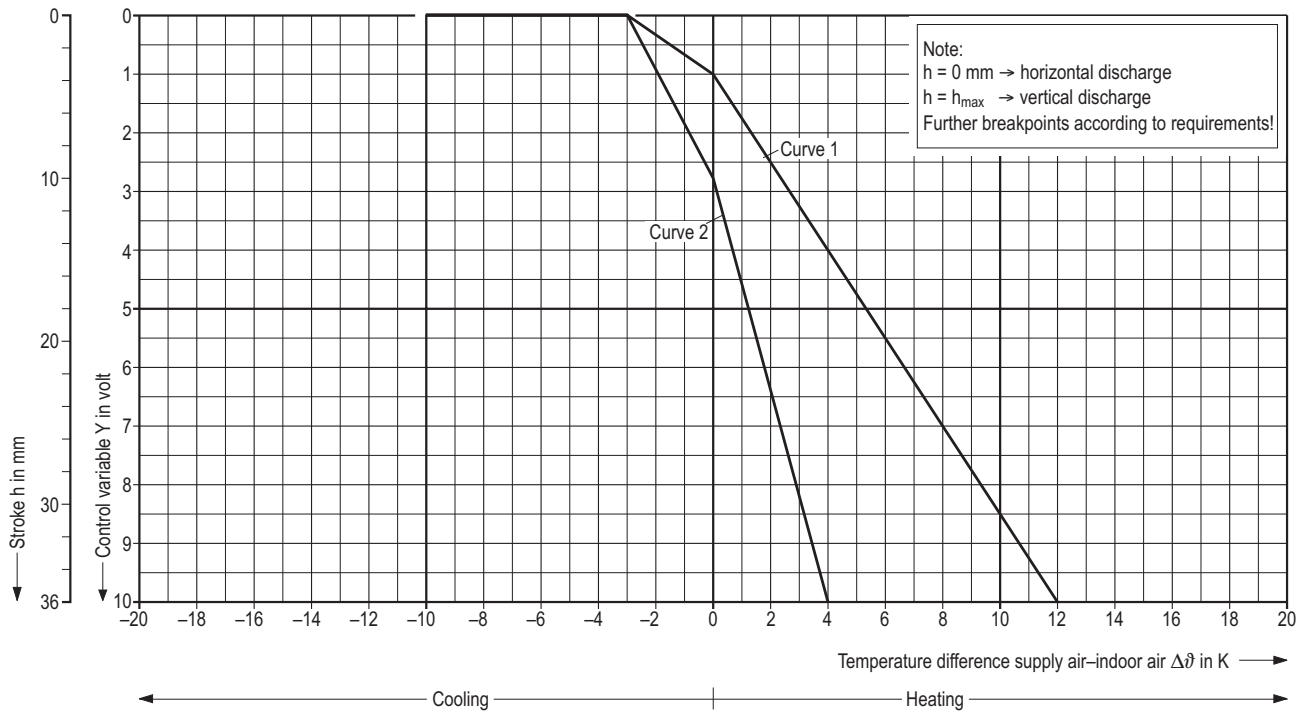
Temperature difference control device

for adjustable air outlets

Control curve for adjustable air outlets (example)



Example:

Adjustable radial outlet		=	DN 500	
Discharge height		=	10 m	
Stroke of swirl cylinder h		=	36 mm	≙ 100%
Volume flow rate	$\dot{V}_1$	=	1389 l/s	Curve 1 [5000 m^3/h]
	$\dot{V}_2$	=	833 l/s	Curve 2 [3000 m^3/h]
Max. temperature difference				
supply air–indoor air	$\Delta\vartheta$	=	–10 K	(Cooling)
	$\Delta\vartheta$	=	12 K	(Heating-up at increased volume flow rate)
	$\Delta\vartheta$	=	4 K	(Heating)

From control curve for adjustable air outlets (curve made by KRANTZ KOMPONENTEN):

Cooling

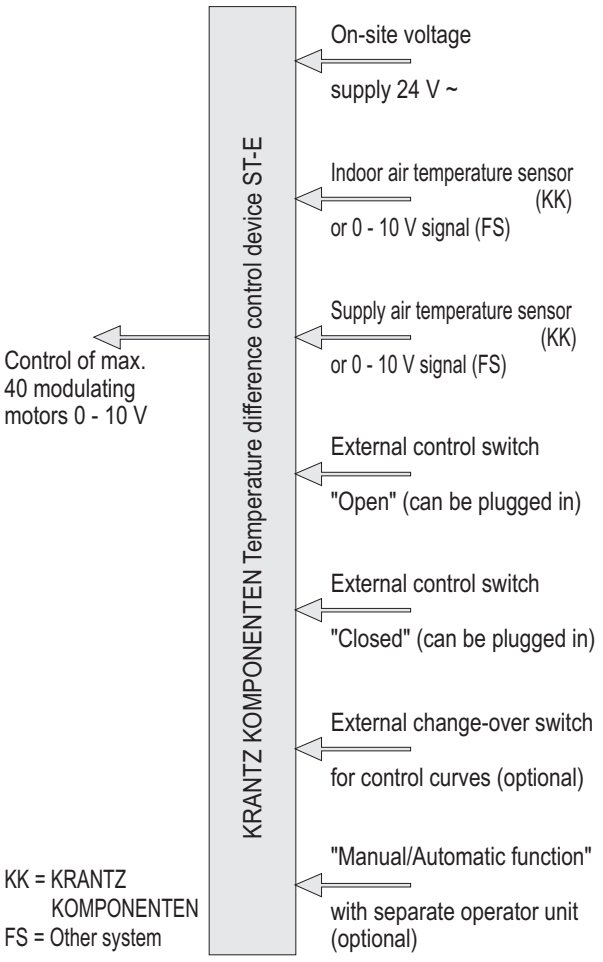
Curves 1 + 2:
$\Delta\vartheta$ = –10 K
h = 0 mm
Y = 0 V
(horizontal discharge)

Heating

Curve 1:		Curve 2:	
$\Delta\vartheta$ =	+12 K	$\Delta\vartheta$ =	+4 K
h =	36 mm	h =	36 mm
Y =	10 V	Y =	10 V

(vertical discharge)

Operation chart of temperature difference control device



Temperature difference control device

for adjustable air outlets

Features

- Automatic adjustment of discharge direction to heating and cooling loads
- Control curves with a maximum of 15 breakpoints
- Two control curves, e.g. for air flow rate lowering and for quick heating-up
- Adjustable working range for temperature differences of ± 20 K
- Fixed-position control easy to set, e.g. for heating-up
- For electric servomotors 0 – 10 V
- Control voltage 24 V AC / 50 – 60 Hz
- Control of a group of air outlets of the same type including up to 40 outlets fitted with 0 – 10 V modulating servomotors
- Preset to the optimum control curve for the respective air outlet type from KRANTZ KOMPONENTEN
- An optional operator unit enables resetting on site

Tender text

..... units

Temperature difference control device for automatic adjustment of the discharge direction in response to the temperature difference between supply air and indoor air, suitable for adjustable air outlets from KRANTZ KOMPONENTEN fitted with 0 – 10 V modulating servomotors.
Design suitable for mounting in a switch cabinet. Automatic recognition of heating or cooling mode.
Two control curves, e.g. for two different air flow rates, can be selected via an external change-over switch.
Possibility to enter non-linear control curves with 4 to maximum 15 breakpoints per curve.
The temperature difference control device is configured by KRANTZ KOMPONENTEN at their works according to the specific project parameters (air outlet type, servomotor, discharge height, air outlet flow rate, etc.). The input data is stored permanently.
Fixed-position control easy to set, e.g. for heating-up.
Temperature sensors for indoor air or supply air can be plugged in either as passive sensors (supplied by KRANTZ KOMPONENTEN) or as active 0 – 10 V signals (e.g. from other systems).
A second temperature sensor for indoor air may be connected to the system for mean value determination (4 passive room sensors via external connection).

Control device suitable for controlling a group of air outlets of the same type including up to 40 outlets,
consisting of:
a temperature sensor for supply air,
a temperature sensor for indoor air, suitable for wall mounting,
a controller for driving the electric servomotors of the air outlets.

Technical data:

Supply voltage:	24 V AC +/- 10%
Frequency:	50 / 60 Hz
Power consumption:	10 VA
Permissible ambient temperature:	0 – 50 °C
Protection for housing:	IP 20 to EN 60529

Make:	KRANTZ KOMPONENTEN
Type:	ST – E

..... units

Operator unit for controller, for parameter resetting and controller operation. It enables the mechanical contractor or system user to adapt the presettings made by the air outlet manufacturer to specific system conditions. It has a display screen for plain text. It also allows for permanent display of all relevant operating data. Where required, the operator unit can be plugged into the controller; it can also be inserted into the front panel of a switch cabinet or switchboard. There is no need for separate power supply. The display screen has backlighting. Alarm signal in case of failure of or short circuit at passive sensors. Indication of past alarms. Parameters are saved in a special memory and can be reloaded where required. The display screen has 8 lines of max. 20 signs each. The languages currently available are English and German; they can be switched over on-line.

Make:	KRANTZ KOMPONENTEN
Type:	ST – BT

– Subject to technical alteration –

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Applied system solutions

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